PbS near-infrared detector Single-Pixel thin-film encapsulated



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Features

- Bondable electrode for COB mounting
- High durability for rugged operation
- Very high sensitivity
- Suitable for automated wire-bonding
- Room temperature operation

Peak responsivity Type No. Active area [mm x mm] S [V/W] Min. Typ. PbS005005BC 0.5 x 0.5 16 · 10⁵ 10 · 10⁵ PbS010010BC 8 · 10⁵ $5.6 \cdot 10^{5}$ 1 x 1 4 · 10⁵ $2.8 \cdot 10^{5}$ PbS020020BC 2 x 2 PbS030030BC 3 x 3 3 · 10⁵ $1.8 \cdot 10^{5}$ PbS060060BC 6 x 6 1.4 · 10⁵ $0.9 \cdot 10^{5}$ PbS100100BC 10 x 10 $0.6 \cdot 10^{5}$ $0.4 \cdot 10^{5}$ PbS010050BC* 1 x 5 $3.5 \cdot 10^{5}$ 2 · 10⁵

Electrical and optical characteristics

* Dark resistance $R_D[M\Omega] = 0.05 - 1$

- Measured with 1550 nm LED, incident power 16 μ W/cm²
- Measured in a voltage divider circuit with 50 V/mm
- Photo responsivity and detectivity are measured with constant load resistance ($R_L = 1 M\Omega$) and calculated for matched resistance

Element temperature [°C]	Peak wave- length λ _P [μm]	20% cut-off wavelength λ _c [μm]	Peak D* (620 Hz, 1 Hz) [cm·Hz ^½ /W]		Time constant [μs]	Dark resistance R _D [MΩ]
	Тур.	Тур.	Тур.	Min.	Тур.	
22	2.7	2.9	$1 \cdot 10^{11}$	$0.8 \cdot 10^{11}$	200	0.3 - 3

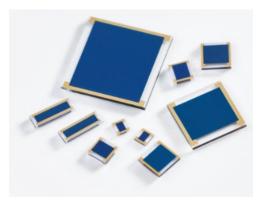
Die attach

- Use clean, soft rubber tip for pick and place handling
- UV-curing is not suitable due to permanent damage by UV light exposure
- Element temperature should never exceed +70°C



Applications

- Flame monitoring
- Flame and spark detection
- Gas detection and analysis
- Spectroscopy
- Temperature measurement
- Moisture measurement



Wire-bonding

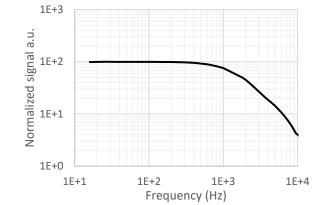
- Electrodes are optimized for room temperature Al-wire-bonding
- Element temperature should never exceed +70°C

Typical spectral response

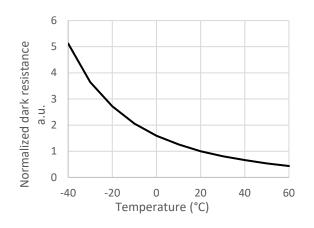


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Typical frequency response



Typical resistance change over temperature



Storage

- Storage temperature: -55°C to +70°C
- Exposure to UV light results in permanent damage
- Prolonged exposure to visible light results in temporary low dark resistance

Handling

- Active area is scratch sensitive, protect top surface from any mechanical contact
- Ensure dust-free environment for device handling
- Operating temperature: -30°C to +70°C

Options

- Custom windows and filters
- Custom packages upon request
- Evaluation Kit available

trinamiX GmbH

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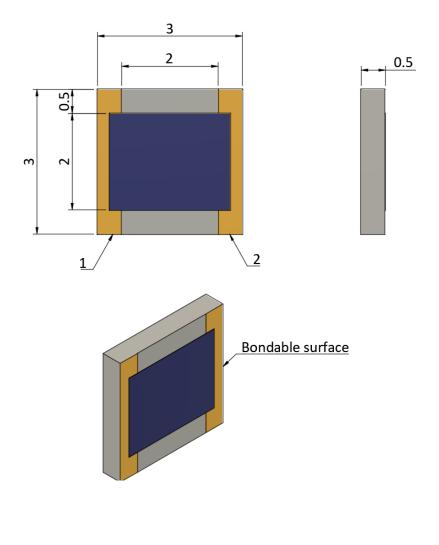
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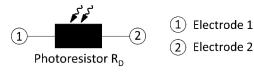
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Exemplary mechanical outlines (mm)

PbS020020BC



Schematic



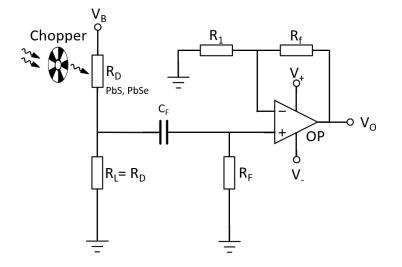
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Exemplary circuit



- V_B: Bias voltage
- V_o: Output voltage
- R_D: Dark resistance of the detector
- R_L: Load resistor
- C_F: Filter capacitor
- R_F: Filter resistor
- R_f: Feedback resistor
- R₁: Gain resistor

Regulatory

For the use of Hertzstück[™] PbS and PbSe infrared photodetectors in medical devices, monitoring and control instruments and consumer applications RoHS exemptions apply.

For automotive applications Hertzstück[™] PbS and PbSe infrared photodetectors fall under ELV exemption.

